

**FEDERAL REPUBLIC
OF GERMANY**

**Document for Public Inspection
DE 198 23 740 A 1**

Int. Cl.

D 21 H 23/28

D 21 H 23/70

B 05 D 1/26

B 05 D 1/02

5 **GERMAN PATENT AND
TRADEMARK OFFICE**

Reference: 198 23 740.5

Application date: 27.05.98

Date of availability

for public inspection: 11.11.99

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Internal priority:

198 20 587.2 08.05.98

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Documents considered in assessing
patent worthiness:

DE 26 06 328 A 1

DE-OS 19 42 348

Representative:

DD 1 30 409

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US 40 81 318

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20 **The following details have been taken from documentation submitted by
the applicant**

Application procedure and device for a paper or card web

25 The invention concerns a procedure for applying a liquid or pasty coating
medium on a running material web of paper or card in a hybrid former and a
device for applying a liquid or pasty application medium on a running material
web of paper or card with a wet part, a press part, and a dry part, where the
procedure contains the following procedural steps:

1.1a still-wet material web is formed on the first screen in the wet part of a
paper or card machine

30 1.2after initial drainage through the first screen, a coating medium is applied to
the side of the material web not covered by the screen

1.3a second screen is then placed on the coated side of the material web and

1.4the material web is also drained through the second screen.

35 The device is characterised in that there is at least one application device
before the second screen, which applies at least one coating medium on the

open surface of the material web.

1. Description

The invention concerns a procedure and a device for applying a liquid or pasty application medium on a running, still-wet material web of paper or card.

5 From the closest prior art, the German Document for Public Inspection DE-OS 19 42 384, an application device is known in which the application medium is applied to a still-wet material web located between two screens. In addition, there are suction devices, which draw moisture from the wet material web but which are also used as supportive elements for the material web in the
10 area where the application medium is applied. The application of the application medium on the material web is carried out here through the screen. Indeed, it is better for the specific overall energy consumption in creating the paper web to apply the application medium to the wet material web, but in applying the medium through the screen, the screen is greatly contaminated with the
15 application medium, which requires intensive cleaning procedures. Thus the initial apparently favourable energy consumption is worsened and a correspondingly higher constructive outlay is required. Incidentally, these cleaning procedures also result in serious environmental pollution and additional laborious measures are necessary to keep the environmental burden
20 within bounds. An additional disadvantage of this method of applying the application medium to a still-wet material web is in that the penetration of the application medium into the material web occurs unevenly due to the network structure of the screen, as parts of the material web are covered with threads from the network structure of the screen, whilst other areas come into contact
25 directly with the application medium through the open weave of the screen.

A further similar application device in the wet area of a paper machine is found in US patent 4,793,899. This document describes an application device in which a material web is brought up to a roller, moistened with application medium, using a screen. A significant amount of the material web goes around
30 the roller, whilst in the area of the angle of wrap of the roller, a screen is lifted from the material web and a second screen is advanced to the material web in the area of the wrap.

This method of applying an application medium to the material web has the advantage that the application is made directly on the material web, but
35 problems do arise in detaching the paper web due to the relatively long duration

of contact of the material web with the large application roller, which ultimately can again lead to irregularities in the application.

5 The task of the invention is to provide a procedure and a device for applying a liquid or pasty application medium to a running, still-wet material web of paper or card, which avoids the disadvantages of the prior art and simultaneously maintains in the overall energy balance of paper manufacture the advantages of applying an application medium in the wet area of the paper machine.

10 The task is solved through the characteristics of the first procedural claim and through the characteristics of the first device claim.

Accordingly, the invention suggests a procedure for applying a liquid or pasty coating medium on a running material web of paper or card in a hybrid former, in which in the wet part of a paper or card machine a still-wet material web is formed on a first screen and after initial drainage through the first screen, 15 a coating medium is applied to the side of the material web not covered by the screen. Then a second screen is placed on the coated side of the material web and the material web is also drained through the second screen. Using this procedure, the contamination of the screen is significantly reduced and the evenness of application is significantly improved. At the same time, compared 20 to application through the screen, a significantly thinner application medium can be used as drainage then takes place through the screen put in place after the application. There is a further advantage in that the next drainage of the web on the application side does not lead to the distribution of the application medium being spread in z-direction, but instead creates a steep distribution profile.

25 A further development of this procedure then removes the first screen and applies a coating medium to the second side of the material web. With this method, both sides of the material web can have the same or different mediums applied so that the same or different surface characteristics can be achieved as desired.

30 In addition, after this second application of the coating medium on the second side of the material web, an additional screen can be placed on the newly coated side of the material web and further drainage can take place if necessary through the additional screen.

35 It is particularly advantageous and protective for the wet and delicate material web if the application of the application medium is carried out on at

least one of the sides using a spray procedure or through a film applicator or extruder; only minor shear forces arise using this procedure.

In addition, it can be of benefit if the application media have different compositions on each side and/or application media with different contents are applied sequentially on one side of the material web.

For optimal evenness of distribution of the application medium, it is also possible to support the material web during application using a supporting element that can also be a suction box.

Advantageous application media can be, for example, chemical colour containing fillers and/or chemical colours free of fillers and/or pigment slurry.

According to the procedure described above, the invention proposes a paper machine with a device for applying a liquid or pasty application medium on a running material web of paper or card with a wet part, a press part and a dry part, which in the wet part has at least a first screen that accepts a pulp slurry and forms the material web, and in a further development has a second screen that is placed on the formed material web and contains drainage elements in its loop. In accordance with the invention, at least one application device is located before the second screen, which applies at least one coating medium on the open surface of the material web.

In a further development of the paper machine, it is proposed that the first screen is then guided away from the material web and there is at least one further application device for the now free surface of the material web. In this, there can be an additional screen after the second application device which is guided to the material web and additional drainage elements can be located in this screen loop. The advantages of the procedure made possible with this design are outlined above under the corresponding procedural claim.

There are additional advantageous designs of the paper machine for the most protective application to the wet material web, where at least one of the application devices is designed as a spray device and/or as a film applicator or an extruder.

To improve the evenness of the application on the surface of the material web over the whole width of the machine, it is advantageous to have at least one supporting element on the side of the material web touching the screen in the area of at least one application device. For example, this can be a supporting roller, a guide shoe or a suction box.

It can also be advantageous to equip the paper machine with a discharge device for excessive coating medium after a minimum of one application device. Here too, additional contamination of subsequent screens and any necessary cleaning of their application medium is avoided.

5 Application media can advantageously be pigment slurry or any pigmented application medium or also pigment-free application media.

Further forms of the invention are described in the sub-claims to the first procedural claim, or to the first device claim and in the following descriptions of the figures.

10 It goes without saying that both the above-stated characteristics of the invention and those yet to be elucidated below can be used not only in the respectively stated combination but also in other combinations or alone without exceeding the scope of the invention.

Further characteristics and advantages of the invention can be seen in 15 the following description of preferred design examples, with reference to the drawings.

The invention will be explained in more detail in the following, using the drawings.

They show:

20 Fig. 1 Hybrid former with application device;

Fig. 2 Hybrid former with application devices on both sides and drainage on both sides;

Fig. 3 Hybrid former with application devices on both sides and drainage on both sides with inflection of the screen carrying the web in between

25 Fig. 1 shows the wet part of a paper machine in accordance with the invention with a headbox 1 from which pulp slurry is placed on a screen 10 placed below which is fed over a roller 6 to the headbox. Following the roller 6, three suction boxes 7 are placed on the lower side of the screen 10 for the initial drainage of the pulp slurry. In this area, a wet fibrous mat is formed: the material web. At the end of the suction boxes 7 an application device 5 is planned for the 30 side of the material web 3 that is not covered by the screen and which places an application medium 4 on the free surface of the material web. This can take place, for example, using a spray device, an extruder or similar. In any case, it is advantageous if an application device is selected that treats the structure of 35 the material web that is still wet in this area in a very protective manner.

Following the application device 5, there is an upper screen 2 that is steered using numerous rollers and is placed from above on the freshly coated material web 3 in the area of a drainage box 8 lying in a screen loop. In the area of the drainage box 8, the material web 3 is drained in the direction of the freshly placed application medium 4. This type of z-direction drainage of the application medium ensures that the application medium does not penetrate too far into the material web and thus a very well defined layer of application medium is created. At the end of the drainage box 8, on the opposite side, a separating suction box is planned to take care of any problematic detachment of the screen 2 from the material web with its layer of application medium. As a support in this area, one of the chambers of the drainage element can be impinged with compressed air to guarantee a simple detachment of the material web 3 from the screen 2.

A further reaching development of the paper machine in the invention is shown in Fig. 2. This likewise shows a headbox 1 that applies pulp slurry to a machine wire web 10 that is steered around a roller 6. As in Fig. 1, following the roller 6 on the screen side, there are suction boxes that take care of the initial drainage of the pulp slurry layer and the formation of a material web 3. Following the suction boxes 7, there is another application device 5 on the free material web side that applies an application medium 4 to the still- wet surface of the material web. There then follows an area in which a second screen 2, supported by steering rollers, forms a screen loop that is placed on the freshly coated surface of the material web 2 and that has a drainage box 8 in the area of the material web, through which the web is further drained. As in Fig. 1, a machine wire web is also planned here at the end of the drainage box, to ensure the smooth lifting of the screen 2 from the material web. Following from this, a second screen 11 is placed on the material web 3, whereupon the lower screen 10 is then removed from the material web 3, supported by a separating suction box 18. A further application device 15 is shown on the now free, non-coated side of the material web 3, on which the application medium 16, which can either be identical to the application medium 4 or may have a different composition, is applied. Following the application of the second application medium 16, a new screen 12 again approaches the freshly coated material web surface. Drainage takes place in z-direction through the newly applied coating of application medium through the drainage box 13 through the newly placed

screen 12. When screen 12 is lifted, a separating suction box and/or an excess pressure box can be planned for the opposite side if necessary.

Fig. 3 shows a schematic representation of a further development of the paper machine in the invention with two application devices. Again, a headbox 1 is shown, which gives up its pulp slurry onto a first screen 10 and, after a drainage section, the application medium 4 is applied to the free surface of the material web through an application device 5. Following on from this, a screen 2 is guided to the freshly coated material web surface and the material web is drained over a drainage box 8. Unlike the two examples already stated in Fig. 1 and Fig. 2, however, the coated material web now remains lying on the surface of screen 2 and is turned through 180° over two steering rollers so that the surface of the material web not yet coated comes to the top. After the material web has been turned, further drainage takes place in this example through two suction boxes 14, followed by a second application device 15 that applies a second application medium 16 to the material web surface not yet coated. To ensure the most even application possible in this area and also to avoid unwanted fluttering, a support element is planned in the area of the application device, which, in the example given, is designed as a supporting roller 17. However, it is also possible to use a suction box or a guide shoe as a supporting element. After the application of the second application medium to the material web surface, a second screen 12 is again advanced to the coated surface of the material web and drainage again takes place in the direction of the newly coated surface through a drainage box 13 located in the screen loop of the screen 12. After drainage, the screen 12 is again lifted from the web surface and the web is guided onwards for further processing in the paper machine.

As a result, the invention and, in particular, the examples described mean that the total energy balance in paper manufacture falls advantageously and, simultaneously, the disadvantages of the current state of technology, particularly the serious contamination and the impression of the screen pattern on the web, are reduced.

List of references

- | | |
|------|--------------------------|
| 1 | Headbox |
| 2 | Screen |
| 35 3 | Pulp slurry/material web |

	4	Application medium
	5	Application device
	6	Roller
	7	Suction box
5	8	Drainage box
	9	Separating suction box
	10	Screen
	11	Screen
	12	Screen
10	13	Drainage box
	14	Suction box
	15	Application device
	16	Application medium
	17	Supporting element
15	18	Separating suction box

Patent claims

1. Procedure to apply a liquid or pasty coating medium to a running material web of paper or card in a hybrid former with the following steps:
 - 1.1 A still-wet material web is formed on a first screen in the wet part of a paper or card machine
 - 1.2 A coating medium is applied to the side of the material web not covered by the screen after initial drainage
 - 1.3 A second screen is then placed on the coated side of the material web and
 - 1.4 The material web is also drained through the second screen.
2. Procedure according to claim 1, characterised in that the first screen is then removed and a coating medium is applied to the second side of the material web.
3. Procedure according to claim 2, characterised in that after the second application of the coating medium to the second side of the material web, an additional screen is placed on the newly coated side of the material web and further drainage takes place through the additional screen if necessary.
4. Procedure according to one of the claims 1-3, characterised in that the application is made to at least one of the sides using a spray procedure.
5. Procedure according to one of the claims 1-4, characterised in that the application is made to at least one of the sides using a film applicator or extruder.
6. Procedure according to one of the claims 2-6, characterised in that the application media have a different composition on each side.
7. Procedure according to one of the claims 1-7, characterised in that the material web is supported by a supporting element during application.
8. Procedure according to one of the claims 1-7, characterised in that chemical colour containing filler is used as at least one application medium.
9. Procedure according to one of the claims 1-8, characterised in that chemical colour not containing filler is used as at least one application medium.
10. Procedure according to one of the claims 1-9, characterised in that a pigment slurry is used as at least one application medium.

11. Paper machine with a device to apply a liquid or pasty application medium to a running material web of paper or card with a wet part, a press part and a dry part, in which
- 5 11.1 there is at least an initial screen in the wet part that accepts a pulp slurry and forms the material web and
- 11.2 further on there is a second screen that is placed on the formed material web, whose loop contains drainage elements, characterised in that
- 10 11.3 there is at least one application device before the second screen which applies at least one coating medium to the open surface of the material web.
12. Paper machine with a device according to claim 11, characterised in that the first screen is then removed from the material web and there is at least one further application device for the surface of the material web
- 15 12. that is now free.
13. Paper machine with a device according to claim 12, characterised in that after the second application device there is a second screen that approaches the material web and this screen loop contains additional drainage elements.
- 20 14. Paper machine with a device according to one of the claims 11-13, characterised in that at least one application device is a spray device.
15. Paper machine with a device according to one of the claims 11-14, characterised in that at least one application device is a film applicator or an extruder.
- 25 16. Paper machine with a device according to one of the claims 11-15, characterised in that in the area of at least one of the application devices there is at least one supporting element, possibly designed as a suction box, on the side of the material web touching the screen.
17. Paper machine with a device according to one of the claims 11-16,
- 30 17. characterised in that there is then a discharge device for excessive coating medium on at least one application device.
18. Paper machine with a device according to one of the claims 11-17, characterised in that pigment slurry or other pigment-containing application medium is used as the application medium.

There follow 3 pages of drawings

	Zeichnungen Seite 1/2/3	= Drawings page 1/2/3
	Nummer:	= Number
5	Int. Cl. ⁶	= Int. Cl. ⁶
	Offenlegungstag:	= Date of availability for public inspection